

Amendments to Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

Claims 1-26 (cancelled).

Claim 27 (new): A method for image recognition of an input image, the method comprising the steps of:

- (a) receiving a three-dimensional model of a candidate object in a particular orientation;
- (b) generating a set of harmonic images for the three-dimensional model, the harmonic images forming a basis for a linear subspace and approximating a reflectance on the candidate object when illuminated by a harmonic light; and
- (c) constructing a candidate image from the harmonic images that represents a point in the linear subspace that is closest to the input image.

Claim 28 (new): The method of claim 27 wherein the candidate image constructed from the harmonic images is restricted to a subset of the linear subspace that corresponds to physically realizable lighting conditions.

Claim 29 (new): The method of claim 27 wherein the candidate image is constructed by seeking a vector a that minimizes $\|Ba - I\|$ where B denotes the harmonic images and I is the input image.

Claim 30 (new): The method of claim 27 wherein the linear subspace is spanned by a first four harmonic images.

Claim 31 (new): The method of claim 27 wherein the linear subspace is spanned by a first nine harmonic images.

Claim 32 (new): The method of claim 27 wherein the linear subspace is spanned by a first eighteen harmonic images.

Claim 33 (new): The method of claim 27 wherein the candidate object is one of a plurality of candidate objects and wherein a candidate object with a three-dimensional model that generates a candidate image that is closest to the input image is selected.

Claim 34 (new): A method for image recognition of an input image, the method comprising the steps of:

- (a) receiving a three-dimensional model of a candidate object in a particular orientation;
- (b) generating a set of harmonic images for the three-dimensional model, the harmonic images forming a basis for a linear subspace and approximating a reflectance on the candidate object when illuminated by a harmonic light; and
- (c) constructing a candidate image from the harmonic images that represents a point in the linear subspace that is closest to the input image by seeking a vector a that minimizes $\|Ba - I\|$ where B denotes the harmonic images and I is the input image.

Claim 35 (new): The method of claim 34 wherein the candidate image constructed from the harmonic images is restricted to a subset of the linear subspace that corresponds to physically realizable lighting conditions.

Claim 36 (new): The method of claim 34 wherein the linear subspace is spanned by a first four harmonic images.

Claim 37 (new): The method of claim 34 wherein the linear subspace is spanned by a first nine harmonic images.

Claim 38 (new): The method of claim 34 wherein the linear subspace is spanned by a first eighteen harmonic images.

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Claim 39 (new): The method of claim 34 wherein the candidate object is one of a plurality of candidate objects and wherein a candidate object with a three-dimensional model that generates a candidate image that is closest to the input image is selected.